areas and gaps that the conference identified as priorities for the 21st century.

Among exciting future research projects to emerge from the conference, Kenneth Olden, director of the NIEHS, unveiled his plan to create the Environmental Genome Project, a broad, multicenter effort to learn how genetic variances in individuals and populations account for differences in susceptibility to diseases with environmental triggers. The project would sequence about 200 known environmental disease susceptibility genes from five main categories: genes controlling the distribution and metabolism of toxicants, genes for the DNA repair pathways, genes for the cell cycle, genes for the metabolism of nucleic acid precursors, and genes for signal transduction systems controlling expression of genes in other classes.

New Questions on Genomic Instability

Cancer researchers have long been puzzled by the discordance of two related observations: that perhaps as many as eight distinct genes must be somehow mutated or altered in order for cancer to occur, and that such mutations appear to occur very rarely and are normally patched up quickly by DNA repair enzymes. The question, then, is how can it be that, out of the 100,000 or so genes in the human genome, the precise mutations needed to transform a normal cell into a cancer cell occur so frequently.

The answer may lie in the relatively new field of genomic instability. Recent research from several laboratories in the United States and abroad indicates that cells exposed to certain carcinogens, particularly radiation, appear to enter a state in which the rate of mutation increases and may stay elevated for 50 or more cell generations following exposure. This state of increased genomic instability may provide the conditions under which cells accumulate the number of mutations necessary to progress to cancer.

John Little, chairman of the Harvard School of Public Health's department of radiobiology, was one of the first researchers to see evidence of genomic instability. In the early 1990s, Little found that some irradiated cells that appeared to have escaped the effects of radiation retained a susceptibility to unexplained gene mutations. Not long after, Eric Wright of the National Research Council in England found a similar elevated rate of chromosomal abnormalities in the progeny of irradiated cells.

Relationships between these two types of genetic disruption may help elucidate this phenomenon. Recently, Little selected slow-growing HPRT gene mutants from cells that had been allowed to divide 25 times after

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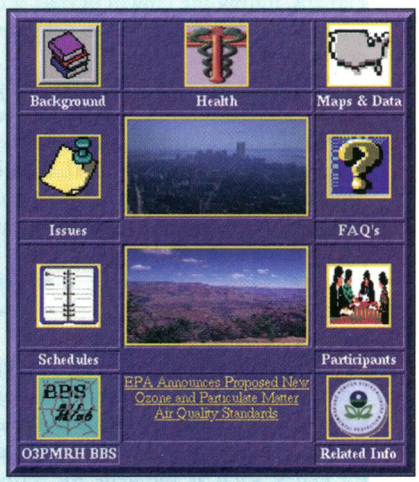
On the Air

For the first time in 10 years, the EPA is revising and updating the Clean Air Act, placing stronger limits on ozone and particulate matter emissions. The proposed rules, which the EPA plans to formalize in June 1997, are designed to reduce the concentration of smog-forming ozone in the atmosphere and to limit emissions of particulate matter smaller than 2.5 microns in diameter ($PM_{2.5}$), a pollutant particularly harmful to human health.

By the EPA's own estimation, nearly 122 million Americans live in counties with air quality that will be considered unsatisfactory under the new ozone standard. This number does not include additional counties that will be out of compliance with the new $PM_{2.5}$ rule.



The EPA maintains a site on the World Wide Web that deals specifically with issues surrounding the proposed air standards, located at http://ttnwww.rtpnc.epa.gov/html/ozpmrh/facahome.htm. The site, which is maintained by the Subcommittee for Development of Ozone, Particulate Matter, and Regional Haze Implementation Programs, connects users to resources ranging from EPA press releases to original scientific data. The subcommittee is a part of the Clean Air Act Advisory Committee that the EPA established in 1990 to assist the Office of Air and Radiation on policy and technical issues associated with implementation of the Clean Air Act in that same year.

For a basic introduction to the EPA's national ambient air quality standards (NAAQS) and the process through which they are revised and implemented, users should follow the Background link on the home page. The EPA Announces Proposed New Ozone and Particulate Matter Air Quality Standards link is connected to pages that describe the newly proposed standards. Some of these pages contain press releases and general information on when and how the standards will be implemented, including how the EPA will monitor ozone and $PM_{2.5}$ levels. Other pages discuss the health effects of air pollutants and describe what areas of the country will be affected by the new rules. The site also provides links to directions for commenting on the revised standards, including mailing instructions, a toll-free telephone number, and several e-mail links.

Under the Maps and Data link on the home page, maps show which areas of the United States would be out of compliance under different averaging time scenarios for the proposed $PM_{2.5}$ and ozone concentration standards (for example, whether the EPA bases ozone exceedances on average concentration over one hour or eight hours). The data used to create these maps can be downloaded from the EPA site by clicking on icons near the maps. The Regional Haze and Visibility section at the bottom of the Maps and Data page shows where in the United States ozone pollution has significantly decreased people's ability to view and enjoy the landscape.

Other links on the home page connect users to resources that provide a more in-depth view of the revision process. The Issues link is the doorway to a collection of original papers used by the EPA in drafting the new standards. Some papers discuss how boundaries should be drawn separating different compliance zones, while others discuss implementation dates and the economic incentives and sanctions that will be used to enforce the new $PM_{2.5}$ and ozone limits. The Schedules link on the home page provides meeting dates and a timeline for the activities of the Subcommittee for Development of Ozone, Particulate Matter, and Regional Haze Implementation Programs, while the Participants link lists the members of each subgroup involved in the NAAQS revision process.